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AND
COMMENT

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OPINION AND COMMENT

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CONTENTS

PAGE

The Collapse of Price Control........ 1
HARVEY W. HUEGY

Federal Labor Legislation, 1946........ 7
E. B. McNATT

Parking Meters: Pro and Con........ 15
R. V. MITCHELL

The Institute of Aeronautics........ 24
LESLIE A. BRYAN

Selection of Airport Sites........ 31
WILLIAM E. THOMAS

This publication of the Bureau of Economic and Business Research is issued upon the assumption that our readers will appreciate interpretative comments on topics of current interest. Because studied opinions on the significance of current trends are often more thought-provoking than tabulations of data would be, the Bureau supplements its research by issuing *Opinion and Comment* as another type of service.

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The Collapse of Price Control

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WHEN the editors of *Opinion and Comment* met last May and this article was sug-
ted for the November issue, the
ction of the title was a forecast.
the time the article was written
sequence of events had made the
ction of the title almost a risk-
prediction. What earlier would
e been an analysis supporting a
liction may thus, by the time the
uscript is in print, be a post-
tem. And, as a natural part of
post-mortem, a review of the
ience of events leading up to the
l act is in order.

his article is not an appraisal of
technical success or failure of
work of the Office of Price Ad-
istration, but rather of the role
rice control in a system of infla-
control. Thus the collapse is not
he Office of Price Administra-
as an administrative agency, but
rice control as a means of in-
on control.

rice control was early recog-
d as an important element in
program designed to curb infla-
. Even before the United States
red the recent war, the well-
embered experiences of the first
rld War period and the historical
ence of the economic effects of
s made it clear that a war im-
s strains on the productive re-
ces which, with deficit financing
other economic dislocations, cause rising prices and the other symptoms of inflation. Invariably in the case of major wars the symptoms were true indicators of the disease, and inflation inevitably accompanied war. As this was true in the past, it was even more probable in the case of a modern total war. Accordingly, remedial measures designed to reduce the inflationary effects of war were instituted during the period of defense preparation which preceded the entry of the United States into the war.

Such measures were more definitely formalized when the President, in April of 1942, presented a seven-point program which was to constitute the basis of the wartime economic policy. Briefly, the program called for:

1. Heavy taxation with the object of keeping profits at a low, reasonable level.
2. An over-all ceiling on prices paid by manufacturers, wholesalers, retailers, and consumers, and on rents in areas affected by war industries.
3. Stabilization of wages.
4. Stabilization of farm prices and restoration of the parity in place of the 110-per-cent-of-parity formula.
5. An expanded war savings program.
6. Rationing of essential and scarce commodities.

7. Discouragement of credit and installment buying and encouragement of debt repayment.

Price control which, up to that time, had been partial or selective was shortly thereafter made practically universal by the issuance of the General Maximum Price Regulation, which, in brief, set the prices prevailing in March, 1942, as a maximum. Subsequently many special regulations which were, generally speaking, designed to hold the price of the commodities covered by such regulations at approximately the March, 1942, or at an earlier base-date level, were issued. A special regulation was usually considered necessary when special circumstances relative to a commodity or trade indicated that special treatment was desirable, or to bring previously uncontrolled commodities or trades under price control. From its inception, the Office of Price Administration issued more than 600 price regulations plus literally thousands of amendments.

It was pointed out at the time, and it has become increasingly clear since, that price control is an aid to the control of inflation but cannot by itself accomplish the desired result. Unfortunately, not all the measures in the seven-point program were put into effect simultaneously. If the objective sought was to hold all elements in the economy in a static condition, and thus preserve during the war years the relationships between the prices of various goods and services and between various segments of the economic family which had prevailed during a peacetime period, it is clear that stabilization as of the same time period should have been universal Such a freezing of all economic relationships could be justified on the ground that peacetime conditions represent a balanced situation. It was clearly easier, though by no means altogether easy, to find the existing or past point of balance between all the elements of a complex economy, and hold everything at this point, than it would be to rearrange all these numerous factors of the economy at some new point of equilibrium. However, delays in the application of the stabilization program occurred, and not all elements were stabilized simultaneously.

As an illustration of the unfortunate time lag in the full application of the various elements of the seven-point program, effective wage stabilization was not attained until toward the end of 1942. Farm prices were not even partially stabilized until almost a year after the over-all ceilings. The heavy wartime tax program was not passed until the year 1943, and because of delay in collections it did not really reduce excess purchasing power until months after the rates had been raised by Congressional action. Further, political considerations prevented high rates on lower-income groups, and these groups were the very ones which during the war period enjoyed the largest relative increase in income and, because of their numbers and the substantial change in their income situations, were contributing most to the inflationary pressures. The war savings program throughout the war was effective in selling large numbers of bonds, but at no time was an adequate amount sold to individuals. Thus, the war was largely financed through the use of bank funds rather than by making the financial operations contribute to inflation controls by withdrawing excess purchasing power from the hands of individuals.

From the very beginning there was a tendency to think of price control as an end in itself rather than as a means toward an end. The major objective of the stabilization program was to avoid, or at least to reduce, inflation; price control was but one of the tools which might be used to accomplish this end. From the beginning a light tool was used to do work heavier than that for which it was designed. Thus the foundation of price control was weakened at the very start and its eventual collapse made more likely.

Despite the failure to move boldly and completely against inflation, a reasonably high degree of success could be claimed for price control during the war period. Prices were prevented from making spectacular advances, partly because during hese years price control was reinforced by the priorities and allocaion system of the War Production Board, and also because considerable restraint on excessive consumer demand was possible through the ationing program. While the prices of many goods and services were held at a level which discouraged roduction, this restrictive effect was not too serious, in part because he over-all profit position of most oncerns was such that they continued to make items at a loss and ecovered their losses from the sale of more liberally priced or uncontrolled military goods. Moreover, discontinuance was not regarded adversely, since the over-all needs of the war program were such that it was desired to prevent the use of scarce material or labor in the making of nonessential goods. The high level of excess profits taxes made producers less anxious to have a profit on every element of their operations; hence the friction engendered by price control was greatly eased. Lubricating the pressure points was the element of patriotism and the feeling that one could put up with many things during the war in the interest of the greater over-all results to be accomplished.

Indexes of prices are usually taken as a measure of the success of the OPA. During this period, the general level of prices advanced from an index of 100 in 1935-1939 to 133.3 in June, 1946, and to approximately 146 in September, 1946, an over-all increase of about 40 per cent over 1941. The failure to stabilize all elements of the economy at the same time is also reflected in the price indexes. Farm prices, which were not brought under control as early as other prices, and for various reasons not controlled so rigidly as some other prices, advanced about 125 per cent over 1941. Industrial prices, which were controlled earlier and more rigidly, advanced only about 32 per cent; rents advanced only about 4 per cent; and the straight-time hourly earnings of industrial workers increased about 60 per cent. Within these broad groups of commodities and services the differences were equally great. Thus the stability which is shown by the cost-of-living price index is more apparent than real. And admittedly a price index does not tell the whole story. Many of the price quotations were meaningless as they represented the prices of goods which were nowhere available on the market, and buyers bought substitute and inferior products at prices higher than those posted. In certain commodities there was a rampant black market, and the effective price for most buyers was the black-market price rather than the quoted or posted prices used in computing the index. It is needless here to go into all the devices which were used to avoid compliance and which raised the real price under the cover of nominal price stability.

With the end of the war period, only lip service was paid to the objective of curbing inflation. During this time the Administration and the government economists vacillated between a belief that we would have a postwar boom and the conviction that we were headed for a serious depression. Predictions of large-scale unemployment were balanced by estimates of huge unsatisfied markets for goods. Shortages and excess purchasing power which would drive up prices to extravagant heights had to be balanced against estimates of greatly expanded production capacity which would result in unwieldy surpluses and weakening of price structures. The raising of wages to maintain purchasing power at the same time that ceilings were being retained to restrain price increases and conserve limited purchasing power illustrates the effort to conform to two different predictions of coming events. It almost seemed as though price control became a major objective rather than a means toward a desired end. We were led to believe that substantial wage increases designed to maintain the take-home pay, despite a reduction in overtime and hours worked, could be paid without increasing costs to the point where prices would have to be adjusted. Labor leaders were encouraged — at least not discouraged — to present their wage demands and strike for their immediate attainment. Materials allocations and priorities were discontinued, rationing programs abandoned, and certain commodities released from price control. By the time the shaky structure of price control was apparent, the weakness of the foundation was making itself felt.

Finally, when the Price Control Act was renewed, efforts were made to write it in terms of cost-plus price control, and cost-plus price control becomes simply profits control. While it is true that price control, particularly of scarce commodities which are not readily reproduceable, will restrain greedy and self-seeking men from fully capitalizing on their positions, control of profits is not the same as over-all price control. True, the fixing of a seller's price inevitably affects his profits, but this is a result incidental to the naming of a proper price rather than the main result, as is the case when price and price adjustments are based on a cost standard, or on costs plus limited profits.

After the period of free prices in July and August, 1946, which followed President Truman's veto of the first legislation passed by the Congress, and preceded the passage of new legislation which he accepted, the attitude of many people toward price control changed. Goods in plentiful supply rather than goods at controlled prices were desired. The disastrous consequences of free prices which had been freely and alarmingly predicted were not apparent during the two months' suspension of price control. In fact, some beneficial results in the disappearance of the black market, more adequate supplies, and prospects of full production were beginning to be apparent.

The new legislation removed certain commodities from price control, presumably those which were in plentiful supply. This presents rather baldly an interesting situation. If prices are held at an artificially low level because a commodity is in short supply, controls must hold that commodity at a level which is less profitable to producers than would be the case were their labor and capital employed in the production of uncontrolled commodities. How then can the goods in short supply ever become plentiful? Will not capital and labor shift to more profitable employment? During this period of peacetime production the full effect of such reaction was apparent. While the market was short of basic standard, staple, lower-priced items, there was little or no shortage of luxury items, new designs, or shoddy merchandise. Another apparent difficulty is that when producers expect their product to be freed from price control they refrain from selling, in the hope that better prices will prevail in the future. The same psychology is present while a firm or industry awaits a decision on a requested price adjustment. Meat, which illustrates many such difficulties with price control, was finally freed in October, 1946.

A less apparent but just as real effect was the disturbance of supplier relations. In the production of most mechanical appliances there is a complex and delicate relationship built up between major producers and a medley of suppliers. Volume production of the finished consumer product depends upon a continuous and closely integrated flow of subassemblies, parts, and raw materials from these independent sources. Under ceiling prices many suppliers found continued delivery to old customers unprofitable, or less profitable than sale to new customers or than the development of other products not under so tight a ceiling. This interfered with full production and forced producers to develop new sources of supply, very often at higher prices, which meant higher costs as well as delays.

Realization of this situation led the OPA to seek greater flexibility through more frequent price adjustments made on a more liberal basis. Here almost insuperable administrative difficulties were encountered. Changing a price leads to a whole series of adjustments, each of which stirs up its own series in a constantly expanding chain. No administration could possibly move rapidly enough to keep ahead of the ever more pressing demands, and each move, instead of settling a problem, merely created a new set of problems.

Currently, what started as a gradual relaxation of controls now seems to be a rapidly moving process of almost complete decontrol. It might be said that the avoidance of further inflation is no longer dependent on control through law and direct administrative action but rather upon natural economic forces operating freely in a new situation.

It thus appears that the structure of price control is rapidly crumbling and ere long will have completely collapsed. One lesson which may be drawn from this experience is that it is almost impossible to have partial price control. It must be all or none. Also that price control without production control, wage control, allocation of capital, and allocation of production is a device which can be employed for only a short period. If employed for long, it produces more evils than it avoids. Another lesson is that control of prices is a very complex and delicate operation and not to be lightly undertaken.

Apparently, under price control we had increased prices and less production. It seems certain that without price controls we will get more production — not entirely because of the removal of controls but because controls are being taken off at just about the time when we were squared away for greatly expanded production in any event. As was said earlier, price control alone could not prevent inflation. If this statement is correct, then it logically follows that the collapse of price control does not make inflation inevitable.

Where we will be twelve months from now is dependent not so much on the collapse of price control as upon more basic fundamental factors. Whether we have a large degree of inflation on top of what we already have depends on such things as the attainment of a balanced Federal budget, which, if accomplished, will prevent the pumping of excess purchasing power into the hands of consumers. Substantial increases in the production of goods, through normal market response, will likewise exercise a restraining influence on prices. In fact, it appears that we are currently in a very favorable position productionwise, with large food crops and with reconversion of many major industries completed. So favorable is it that many observers fear a price break and a recession rather than further price advances. But, as with so many economic situations, much depends on the actions of people: for example, the restraint of labor leaders in avoiding unnecessary production tie-ups and in seeking to further the long-run real interests of labor rather than in seeking immediate and temporary advantages through strikes or unreasonable demands; also upon the exercise of constructive business statesmanship which will avoid precipitating labor troubles, and which will forgo greed and the desire for immediate profits and thus refrain from unwise or extreme price increases. And each of us, as a citizen and a consumer, can do his part by curbing the natural tendency to buy extensively or to pay excessive prices simply because we have enough money to do so. Thus, if we all exercise good common sense, each in his own sphere, we can avoid contributing to a wage-cost-price spiral.

Federal Labor Legislation, 1946

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THE 79th Congress, which adjourned on August 2, 1946, will be remembered more for he labor legislation introduced than or labor legislation finally enacted. Seldom has a Congress been deluged with such a volume of proposed leg-slation dealing with various aspects f labor problems. Perhaps it was nevitable that our first year of eace after a long and costly war would be marked by major crises nd problems in the field of labor elations. Certain it is that many of hese labor issues assumed spectacu-ar proportions during the months mmediately following V-J Day and emanded the time and attention of he entire nation. Congress reflected his national interest in labor affairs y introducing an unprecedented olume of proposals for new labor aws and amendments to old ones. This article will attempt a brief re-iew of enacted and proposed leg-slation.

Despite the volume of proposed abor legislation, only three new abor laws and amendments to two ld laws emerged from the Congress in 1946 and were signed by he President. Two of the three new aws— the Hobbs Anti-Racketeer-ng Law and the Petrillo Law—may e called "limited purpose" laws, nasmuch as they were aimed primarily at the practices of two par-cular unions. The third new law — he Employment Act of 1946 — has much broader social objective. In addition, certain amendments to the Social Security Act and to the Railroad Retirement and Railroad Unemployment Insurance Acts were enacted.

The Hobbs Anti-Racketeering Law

The Hobbs Anti-Racketeering Law, signed by the President on July 3, 1946, was the first piece of major labor legislation enacted since the wartime Smith-Connally law. The new law is simply an amendment of the Copeland Anti-Racketeering Law of 1934. In 1942, the Supreme Court ruled that the Copeland Act did not apply to "the ordinary activities of trade unions," because the language of this Act excluded "the payment of wages by a bona fide employer to a bona fide employee," (*U. S. vs. Local 807, International Brotherhood of Teamsters, Chauffeurs, Stablemen, and Helpers, A.F.L.*). This language, the majority of the Court held, excluded from the Act's coverage such activities as stopping trucks on main highways and forcing drivers thereof or their employers to pay the local union scale to the members of the local union before continuing the journey.

The new law removes from the 12-year-old Copeland Act the language construed by the Supreme Court to confer special immunity upon labor unions. The Hobbs Amendment makes it a felony for *anyone* to interfere with or obstruct interstate commerce by robbery or extortion. The criminal penalties for violation of this law subject the guilty party to a fine of $10,000, two years in prison, or both. "Robbery" is defined as "the unlawful taking or obtaining of personal property, from the person or in the presence of another, against his will, by means of actual or threatened force, or violence, or fear of injury, immediate or future, to his person or property, or property in his custody or possession, or the person or property of a relative or member of his family. . . . " "Extortion" is defined as "the obtaining of property from another, with his consent, induced by wrongful use of actual or threatened force, violence, or fear, or under color of official right."

Although obviously aimed at certain practices of the Teamsters' Union, the drastic criminal penalties and the broad application to "whoever" by robbery or extortion interferes "in any way" with interstate commerce, or "conspires" or "attempts," or "participates in an attempt" to do so, might have been interpreted in such a way as to curtail many normal activities of trade unions. President Truman, in vetoing the Case Bill, said that a provision almost identical with that found in the Hobbs Amendment was not objectionable in its "objectives," but that the manner of its inclusion in the Case Bill raised a serious question as to whether it was intended to weaken the protection afforded labor by the Norris-La Guardia Act, the Wagner Act, and other existing Federal laws. The President concluded that, standing alone, the Hobbs Amendment was no longe subject to his prior objection, but t insure that subsequent court interpretation would not extend the provisions of this amendment to crippling restrictions upon normal trad union activities, he sent a specia message to Congress stating that hi approval of the Hobbs Amendmen was based upon advice from th Attorney General that the new measure "does not in any way interfere with the rights of unions in carrying out their legitimate objectives." Pointing to the provision of Title II of the Act, which provided that it shall not "repeal modify, or affect" the Railway Labor Act, the Norris-La Guardia Act the Wagner Act, or specified sections of the Clayton Anti-Trust Act the President stressed the legislative history of the amendment which clearly established, according to the Attorney General, that "the Bill is not intended to deprive labor of any of its recognized rights, including the right to strike and to picket, and to take other legitimate and peaceful concerted action."

The Hobbs Amendment will probably have only a very limited application in practice. Any tendency toward a broad application of its restrictive provisions to everyday union activities will be checked by the President's approval message on legislative intent. The courts will undoubtedly give this statement of the Chief Executive great weight in interpreting the law, inasmuch as it was made in direct connection with his approval of the bill to make it law. Furthermore, action under this amendment can be initiated only by the Federal government, since t is a criminal statute. Thus it is unlikely that the Hobbs Amendment will result in any major addition to the existing law of labor relations.

The Petrillo Law

On April 16, 1946, President Truman approved the so-called "Pe-rillo Bill," [The Lea Act, Public Law No. 344, 79th Congress]. This aw was aimed even more specifically and directly at the activities of one union than was the Hobbs Amendment. In fact, the language of the "Petrillo" law limits its applicability so completely to the musicians' union that there is almost no possibility of its extension to other unions. This Act amends Title V of the Communications Act of 1934 by inserting a provision prohibiting ertain coercive practices affecting adio broadcasting. Briefly, the law makes unlawful "the use of force, violence, intimidation, or duress" to compel radio broadcasters to hire more persons than needed, pay per-ons for work not performed, or pay more than once for a performance, or refrain from broadcasting certain ypes of programs, or from using ecords or other equipment in broad-asting. Criminal penalties are provided for violations.

It was apparent from the legislative debate on this law that it left a number of questions unanswered. For example, who was to determine ow many persons were needed, the mployer or the courts? And to what xtent had this amendment limited he use of strikes and picketing by he musicians' union? The musicians' union promptly dubbed the new law unconstitutional as involving involuntary servitude, and announced its immediate intention of contesting it in the courts. On June 13, 1946, Attorney General Clark filed a criminal information in the United States District Court in Chicago against James C. Petrillo, President of the American Federation of Musicians, charging him with coercive practices in violation of the Lea Act.[1] Until final court action and interpretation, no definite conclusions can be drawn as to the significance of the Lea Act in changing the existing law of labor. If, however, the amendment is upheld by the courts, and interpreted in accordance with the legislative intent, there can be little question that many current practices of the musicians' union will have been outlawed.

The Employment Act of 1946

The Employment Act of 1946 [Public Law, 304], signed by the President on February 20, 1946, represents the broadest piece of labor legislation enacted by the 79th Congress. This law represents an extremely "watered-down" version of the Murray Full Employment Bill introduced in 1945. Briefly, this law provides for a council of three economic advisers to assist and advise the President in the preparation of an "economic report" which is to be submitted annually to the Congress. This report will be studied by a joint committee consisting of seven members from each house of Congress. This committee in turn will seek methods of implementing the recommendations contained in the Presidential report. The new law states that the "continuing policy and responsibility of the Federal Government" shall be "to use all practicable means consistent with its needs and obligations, with the assistance and cooperation of industry, agriculture, labor and State and local governments, to coordinate and utilize all its plans, functions, and resources for the purpose of creating and maintaining, in a manner calculated to foster and promote free competitive enterprise and the general welfare, conditions under which there will be afforded useful employment opportunities, including self-employment, for those able, willing and seeking to work, and to promote maximum employment, production and purchasing power."

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[1] On December 2, 1946, the Lea Act was declared unconstitutional in the Federal District Court of Chicago. Federal Judge La Buy dismissed the government's criminal charge against James C. Petrillo on the ground that the Lea Act violates the First, Fifth, Thirteenth, and Fourteenth Amendments to the Constitution. Government attorneys immediately filed notice of their intent to appeal the decision to the United States Supreme Court for a final ruling on the constitutionality of this Act.

The new law has generally been regarded as a defeat for the Administration, which had asked Congress for legislation establishing full employment as a Federal policy and providing money and machinery for Federal works programs to take up any slack in private employment. Such provisions were contained in the original Murray Full Employment Bill. The new law changed these provisions very materially. In the first place the present law substitutes "maximum employment" for the Administration-backed "full employment." Second, the Murray Bill's provisions with reference to the use of public works and Federal loans as a means of creating full employment were dropped in the present law in favor of a policy of using "all practicable means" to insure "maximum employment." Third, these "practicable means" will be used "to promote," not to "assure" or "guarantee," employment to every person seeking a job. As finally passed, therefore, the present law does not commit the Federal government to guaranteeing "the right to work" or "full employment" by compensatory Federal spending. It is primarily in this respect that proponents of the original Murray Bill feel that the Employment Act of 1946 has fallen short of a desirable social objective.

Social Security Act Amendments

A considerable number of major amendments to the Social Security Act were proposed in the 79th Congress; only a few relatively minor amendments were finally adopted. These amendments were approved by the President on August 10, 1946 [Public Law, No. 719]. The principal amendments to the present Act increased the amount of Federal funds available to the states for old age assistance, aid to the blind, and aid to dependent children. For old age assistance and aid to the blind, the maximum individual payment in which the Federal government is allowed to share under the amendnents is increased from $40 to $45 er month. For aid to dependent hildren, the sharing maximum is ncreased from $18 for one child in he family and $12 for each child eyond the first, to $24 and $15 per nonth, respectively. The Federal overnment may also share a larger roportion of the individual assistnce payments. Prior to these mendments, the Federal governnent matched state expenditures on 50-50 basis up to $40 per month or the aged and the blind, and $18 or the first child and $12 for each dditional child. Now the Federal overnment may share two-thirds f the first $15 of the average nonthly payment for old age assistnce and aid to the blind, and two-hirds of the first $9 for aid to deendent children. The Federal share f the administrative costs of the ssistance programs is also now nade uniform by providing for Fedral sharing of one-half of a state's dministrative expenses for old age ssistance. In addition, the new mendments increased by $10,800,00 the Federal funds authorized or maternal and child health, cripled children, and child welfare ervices. If the states make the ecessary changes in their present ssistance laws, they will be able to btain and use the additional Fedral funds to increase the amount of ayments to present recipients, and ld new people to their rolls. It is timated that the total cost to the ederal government of all these new ssistance grants will amount to bout $560,000,000 annually.

The old-age and survivor insurnce program was amended only slightly. Survivors of World War II veterans, in recognition of the fact that many ex-servicemen either lost old-age and survivor insurance protection or were prevented from acquiring it because of their military service, are extended such protection under the amended act. This amendment provides that the survivors of veterans who die within three years of their discharge may receive social security benefits unless they are receiving compensation or a pension from the Veterans Administration. It is estimated that this amendment will cost the Federal government about $175,000,000 through 1959, and will benefit 100,000 to 150,000 survivors of World War II veterans. Other minor amendments to the old-age insurance program slightly relax the requirements for the attainment of currently insured status, and ease some of the requirements applying to qualifications of wives', children's, and parents' benefits. The present contribution rates to the Federal old-age and survivor insurance trust fund are continued at one per cent of 1947 wages for both employer and employee, with provision for the rates to increase to two and one-half per cent for each in 1948.

Only one significant change was made in the unemployment compensation provisions of the Social Security Act. The Federal Unemployment Tax Act was amended to include maritime employment, thus providing coverage under state unemployment compensation system for some 200,000 maritime workers. Major Administration-backed proposals for amending Federal unemployment compensation provisions to extend their coverage to such presently exempted groups as Federal employees, agricultural workers, and employees of small concerns, and to increase unemployment benefits to a minimum of $25 per week for a maximum duration of 26 weeks in any one year, were defeated.

Railroad Retirement and Unemployment Insurance Amendments

In sharp contrast to the minor amendments made in the Social Security Act in 1946, major amendments to the Railroad Retirement Act and to the Railroad Unemployment Insurance Act were enacted by the 79th Congress. [Public Law No. 572, approved by the President, July 31, 1946]. The old laws already provided considerably more liberal old-age, disability, and unemployment benefits for railroad workers than the Social Security Act provided for other workers; the new amendments further increased this disparity by providing still larger benefits for some two million railroad employees.

Under the new amendments, the pay-roll tax contribution from the employer and the employee for the support of the railroad old age retirement system is increased from 3½ per cent from each to 5¾ per cent in 1947, increasing to 6 per cent in 1949, and to 6¼ per cent in 1952. Thus in 1952, 12½ per cent of pay rolls will be paid in to the railroad retirement fund — half from the employer and half from the employee. As a result of these higher contributions, much higher retirement benefits are provided. The new benefits are modeled after those paid under the Social Security Act, but the monthly payments will average about 25 per cent higher, and the lump-sum payments about two-thirds higher, than those available under the Social Security Act. In addition, the conditions were liberalized under which minimum retirement annuities are payable to workers with low wage service records, and the amount of these annuities was increased. For example, under the new amendments most railroad workers will have enough service on retirement to qualify them for monthly annuities of at least $50.

The conditions under which disability retirement annuities are payable were also liberalized, and the amount of such annuities was increased for most workers under the new amendments. Cash benefits in case of sickness were furthermore provided, the amount and duration of these benefits to be the same as in the case of unemployment. The employer pay-roll tax of 3 per cent for the payment of unemployment compensation benefits was left unchanged under the amendments, but the amount and duration of unemployment benefits for railroad workers were increased considerably. Railroad workers may now qualify for maximum unemployment benefits of $5 per day for a maximum duration of 26 weeks in any one year.

It is obvious that these amendments to the Railroad Retirement and the Unemployment Insurance Acts have greatly increased the protection of railroad workers against he various hazards of economic in-ecurity. It is equally obvious that his increased protection for railroad vorkers brings into sharper relief he deficiencies of the present Social ecurity system.

Proposed Legislation

erhaps the outstanding feature of he 79th Congress, so far as labor egislation is concerned, was its omplete failure to enact any ac-eptable legislation for the settle-ent of labor disputes. Starting soon fter V-J Day, a series of work toppages began in a number of rge basic industries over the wage ssue and spread rapidly during Oc-ober, November, December, and anuary. Paralleling this develop-ent, the Congress considered many ifferent proposals for Federal ma-hinery to insure industrial peace. ills providing for Federal con-liation, mediation, and compulsory rbitration [the Ball-Burton-Hatch ill, S. 1171], public fact-finding oards [H.R. 4908, S. 1661], and veral strike-control bills [the Case ill, H.R. 4908, and the emergency rike control bills, S. 2255 and H.R. 578], were all introduced during his period. Only one of these bills he Case Bill) succeeded in finally assing both houses of Congress, but was vetoed by the President.

As passed by the Congress, the ase Bill had a number of severely strictive labor provisions. It pro-ded, among other things, for a ederal mediation board, voluntary bitration, and a compulsory "cool-g-off" period before striking; for vil suits for breach of labor agree-ents; for Federal Court jurisdiction to enjoin non-peaceful picketing; for penalties for certain types of labor boycotts; and for the exclusion of supervisory employees from the protection of the Wagner Act. Considered in toto, President Truman found the Case Bill too restrictive of certain basic labor rights and refused to approve it. He suggested certain labor standards for an approvable bill which Congress debated for the next several months without any final action. In May, 1946, as a result of a crippling railroad strike, the President asked Congress for an emergency strike control law which would empower the President to draft strikers in cases in which the public welfare was seriously threatened. This bill passed the House but was defeated in the Senate. Thus the 79th Congress adjourned in August, 1946, without enactment of any final legislation for the settlement of labor disputes.

Other labor bills which were proposed and debated by the Congress, but which failed of final enactment, covered a wide variety of subjects. A proposed amendment to the Fair Labor Standards Act [S. 1349] would have established a new minimum wage floor of 65 cents per hour for all workers covered by this Act. The present legal minimum wage of 40 cents per hour has been rendered completely obsolete by the war and inflation. During the war, the War Labor Board first adopted 50 cents per hour as the minimum wage necessary to correct substandards of living, and it raised this to 55 cents before V-J Day. Congress instructed the Wage Stabilization

Board (successor to the War Labor Board) last spring to use 65 cents per hour as its approvable minimum wage in processing wage stabilization cases. When it is considered how little 65 cents per hour, or $26 per week, or $1,300 per year, will buy in terms of 1946 prices, and when it is further considered how few industries today are paying as little as the current legal minimum, small excuse can be found for Congressional inaction on this proposal. It was, therefore, a keen disappointment to labor when the Senate passed the 65-cent-minimum-wage bill with the inflationary Pace rider, and the House failed to take any final action on the measure.

Among other labor bills which were introduced, but which failed of enactment, were the following: (1) the Women's Equal Pay Bill [S. 1178] which would have made it an unfair wage practice for an employer to pay female workers less than males for comparable work; (2) the Permanent Fair Employment Practices Commission Bills [S. 101; H.R. 2232], which would have continued the wartime Fair Employment Practices Committee; (3) the Wagner-Ellender-Taft Bill [S. 1592], which would have provided for a long-range housing and slum-clearance program; and (4) the Wagner-Murray-Dingell Health Bill [S. 1606], which would have established a national compulsory health insurance program aimed at providing adequate low-cost medical care.

In view of these facts, it must be admitted that the record of the 79th Congress in the field of labor legislation was not outstanding.

The Strong Points. — The strong points in the business outlook are obvious. Except in relatively few lines, demand for goods is active and unsatisfied; most manufacturers can sell everything they can produce and see a market ahead that cannot be filled for months, in some cases for years. The need for residential building can be projected far into the future. Automobile production has not yet caught up with the current rate of scrapping, so that the restoration of the deficit in the nation's stock of automobiles created since 1941 has not yet begun. In other consumers' durable goods and in most non-durables urgent demands are far from satisfied, and people have income, savings and credit resources to buy them. The whole world wants American goods and most of our important customers can pay for them, either through dollars and gold accumulated during the war or through credits extended since. It is significant that in most cases the misgivings of manufacturers have to do not with uncertainty as to demand, but with the difficulty of lifting production. — From the October letter of the National City Bank of New York.

Parking Meters: Pro and Con

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Many people maintain that parking meters offer one of the best solutions to the parking problem; others are skeptical. Some denounce parking meters and label them an illegal means of placing an additional tax burden on the motorists.

Before the war, the number of cities which installed parking meters ncreased each year from the time of the first installation in July, 1935, until it reached a peak in 1941, with approximately 100 cities throughout the country making installations in that year. During the war fewer nstallations were made. Parking meters were not manufactured throughout the period from August, 1942, when production was prohibited by order of the War Production Board, to the end of the war n 1945. Then, too, the restrictions on tire and gasoline consumption and the limitations on automobile production lessened somewhat the need for increased parking facilities. With the lifting of restrictions, however, communities throughout the nation are again giving consideration to the increasing difficulty of providing parking space for their customers in the downtown business districts.

Before the war it was estimated hat three of every four cars and rucks on all rural roads either start from or stop in a city, with the downtown district the main origin or destination; that one-half of all miles of motor travel is entirely on city streets; and that one-third of all motor trips *start* and *end* within the city limits, with the downtown district again the chief attraction. In 1920, we had 10 million motor vehicles, and they traveled about 30 billion miles a year. By 1941, we had 34 million vehicles — over 3 times as many — and they traveled 300 billion miles a year — one thousand per cent increase in traffic in one generation. And it appears that we have not reached the peak. It is expected that postwar traffic will continue to increase and that future increases in cities will be at an even faster rate than those on rural roads.[1] This outlook has again focused the spotlight on the use of parking meters, with a great number of cities asking, "Will they solve our parking problem?"

In evaluating parking meters as a means of solving the parking problem, all the arguments pro and con should be discussed and all evidence available should be considered. Although such a procedure is desirable, space here permits only a brief discussion of the arguments for and against parking meters and a review of the extent to which meters are now being used.

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[1] Mickle D. Grant, "Local Parking Problem Solutions," *Journal of American Insurance*, Volume 22, No. 4, April, 1945, p. 18.

At the present time more than 500 cities are operating parking meters. Among them are municipalities of all sizes throughout the United States — Cleveland, Ohio, or Lake George, New York (population 803). Actually meters are of greatest importance in cities between 25,000 and 500,000 population, with about 50 per cent of these cities operating meters. Within this group the greatest relative importance falls in the group of cities between 100,000 and 250,000 population. Thirty-eight of the 55 cities, or almost 70 per cent of this group, have installed parking meters. Recent trends, however, indicate that the greatest relative increase since 1942 has been in the cities between 10,000 and 25,000 population. Approximately one-fourth of these cities are now operating meters.[2]

The most recent data available indicate that 23 cities and one park district within Illinois have installed parking meters. Five of these cities have a population of 10,000 or less; seven are within the 10,000 to 25,000 population group; seven within the 25,000 to 50,000 bracket; and four have populations of more than 50,000.

Arguments for Parking Meters

The arguments for parking meters can be grouped under four major headings: (1) effect upon enforcement; (2) effect upon parking spaces and traffic; (3) effect upon city budgets; and (4) effect upon business and property values in downtown areas.

In regard to the effect of parking meters upon enforcement it is alleged that parking meters make enforcement of parking regulations easier; that they give a much more accurate and complete check of actual parking time than is possible otherwise; and that parking meters have done away with special parking privileges.

Obviously parking meters are not self-enforcing, but the laborious process of chalking tires is eliminated by their use. Moreover, the check on parking time made by meters is usually more accurate in view of the fact that the timing begins immediately after the car is parked; whereas in the chalking-tire system cars may be parked for a considerable time before marking. In addition, the meters probably have a psychological effect in making motorists more conscious of parking regulations and tacitly implying that the regulations will be enforced. The assertion that parking meters have done away with special parking privileges, however, does not seem logical. As already pointed out, parking meters are not self-enforcing. The human element must be present and it may extend privileges. It is true that several cities have revised their method of making out and handling violation tags since the installation of parking meters, but such steps are not dependent upon meter installations. It would seem that privileges could be extended or eliminated under either system — with or without meters.

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[2] *Municipal Year Book, 1946* (The International City Managers' Association, Chicago), pp. 461-470.

A number of arguments for parking meters may be grouped to show their effect upon parking spaces and traffic. The usual arguments included in this category point out that (1) parking meters increase the turnover of parked cars, thereby making it possible to accommodate more automobiles in a given area during a given time; (2) parking meters keep the all-day parkers (often automobiles of downtown businessmen) off the streets and permit shoppers from within the city or out of town to find parking space in the business district; (3) parking meters reduce cruising of motorists in search of parking space; (4) parking meters reduce double parking; (5) parking meters facilitate the movement of traffic and increase traffic speed; (6) parking meters facilitate the delivery of merchandise and supplies to business establishments in a congested area; and (7) parking meters reduce traffic accidents, prevent denting of fenders, and make entry and exit from the curb easier and more orderly.

Many "before-and-after" studies show that the number of cars occupying a given parking space is greatly increased by the installation of parking meters. For example, the ncreased turnover in Kansas City as a result of meter parking amounted to 18 per cent.[3] A study in Pittsburgh showed that approximately one-third more cars could be parked within a given time period after neters were installed.[4] In Portland, Oregon, every location showed an ncrease in turnover varying from to 122 per cent, with an average ncrease of 54 per cent.[5] Other cities have reported similar experiences; the increase in turnover shown in the various reports shows considerable variation depending upon the system in effect and the degree of enforcement before meters were installed.

The argument that parking meters prevent all-day or long-time parking needs no proof, if we assume that the regulations are enforced, for very few meters are set for as long as two hours, most of them being set for thirty minutes to one hour and some few for as short a time as ten or fifteen minutes. If these same time limit restrictions were adequately enforced without meters, they should prevent the all-day parkers from monopolizing the curb space. The fact that many cities have shown marked improvement in eliminating all-day parkers from the curbs after meters were installed shows, however, that they could not — at least did not — enforce parking restrictions adequately without meters. It would seem, therefore, that to the extent that meters give better, more complete, and more accurate enforcement they improve the parking situation in the business district by moving the all-day parkers off the streets and giving the shoppers a chance to park.

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[3] T. J. Seburn, "Transportation Speeded by Kansas City Parking Meters," *The American City*, New York, March, 1942, pp. 83-85.

[4] Charles F. Leedecker, "Parking Meter Survey in Pennsylvania Municipalities," *Commonwealth of Pennsylvania Department of Internal Affairs*, Harrisburg, Pennsylvania, Vol. 13, No. 1, December, 1944, p. 10.

[5] Ormond R. Bean, "Parking Meters in Portland — Eight Months Experience Reviewed," *Western City*, January, 1939, pp. 14-16.

Of course, the fact that all-day parkers are kept from the curbs in the business district does not necessarily mean that parking space will be available at all times for motorists who desire to park for short periods. The possibility of finding a place to park will be increased, but the actual results depend upon a number of factors such as the number of spaces available, the time limit provided, and the demand for space.

The argument in regard to increased turnover and the elimination of all-day parkers points out that after meters are installed a greater number of curb parking space hours are usually available for use by motorists. If this conclusion is accepted, it follows that parking meters should have a tendency to reduce cruising in seach of parking space and lessen double parking. If these tendencies materialize, further possibilities may develop. Reductions both in cruising and in double parking should facilitate the movement of traffic and the delivery of merchandise. There should even be a tendency for traffic accidents to be reduced.

The logic of these conclusions in regard to cruising for parking space, double parking, and the movement of traffic appear to be supported by various reports from cities which are using parking meters. A few cities have reported an increase in cruising for space and a slower movement of traffic after meters were installed, but the great majority have experienced a reduction in cruising and an increase in traffic speeds.

Evidence in regard to the effect of meters on traffic accidents is meager and rather difficult to evaluate. Although a few cities have reported a decrease in accidents after meters were installed, it is difficult to determine the extent to which meter operation contributed either directly or indirectly to this achievement. Logically, several factors indicate that there should be a tendency for accidents to be reduced. Less cruising in search of parking space and less double parking should reduce some of the traffic hazards. Where parallel parking is used, the longer and more systematically arranged spaces provided by meters should make entry and exit from the curb easier and more orderly. Moreover, revenue from parking meters should enable many cities to increase their work in traffic control, traffic safety, and traffic engineering. All these factors indicate a tendency for a reduction in accidents. The actual effect, however, is difficult to determine.

The third major group of arguments for parking meters introduces the questions of revenue and costs. It is alleged that parking meters bring into the city treasury revenue over and above the costs of operating meters which makes possible general traffic and parking improvements not practicable under more restricted budgets.

The amount of money collected from parking meter operation varies, depending upon a number of factors. Obviously, such differences as the amount of the feet (1, 2, 5 cents, etc.), the time allowance (12, 15, 30, 60 minutes, etc.) and the number of hours during which meters are in operation each day — all have a direct bearing on the daily collections. The amount of receipts, however, cannot be determined by merely using these factors in a straight mathematical calculation. The revenue may be greater than the theoretically determined figure because of a high rate of turnover; some of the additional parkers may deposit coins and not merely use the unexpired time of the previous user of the space. On the other hand, the actual collections may be less than the theoretical base, as a result of slow turnover (violations) or incomplete utilization of the space.

Although these variations make it rather difficult to forecast receipts or to analyze the revenues reported by individual communities, the individual reports and studies that have been made do indicate the extent of variation in revenue and the amount of actual collections. A review of individual reports and summaries shows that meter receipts have varied widely, with the report for one community giving annual collections per meter of $6.03 and another of $158.40. Various summaries also show a rather wide range in the averages that have been prepared, from about $45 to $85 annual receipts per meter.

The relationship between total revenue and total costs from meter operation is difficult to determine. Although the amount of total revenue can be ascertained easily, the determination of total costs involves difficult expense allocations. Because of this difficulty, comparisons are usually made between revenue and direct cost items, or revenue and total police department expenditures. Although both of these comparisons are inaccurate, they do indicate that parking meters usually provide funds that may be used for general traffic and parking improvements. The relationships between costs and revenue, however, show considerable variation. For example, parking meter revenue in one city amounted to 2 per cent of total police expenditures, and in another to 200 per cent. The wide variations in revenue and in the relationship between revenue and police expenditures suggest that before installation is made each city should make its own individual forecast of revenue and costs, based upon an analysis and study of local conditions.

In regard to the effect of parking meters upon business and property values in downtown areas, those in favor of parking meters contend that (1) parking meters bring increased business to merchants who are in the parking meter zone because of the greater flow of cars in and out of these areas; (2) that parking meters mean increased business for owners of parking lots and garages as the all-day parkers move from the curbs to spaces providing longer parking time; and (3) that parking meters stabilize and, in many cases, increase values of property by halting or reversing decentralization trends.

The arguments in regard to the effect of meters on sales within the business district are not easy to measure definitely. Many factors may affect sales, and thus make the segregation of any one of these and its corresponding effects extremely difficult. Probably one of the best indications of the effect of meters upon business can be obtained from the reaction of businessmen to meter installations. It seems rather safe to assume that the merchant's reactions are closely tied in with those of his customers and his business. According to this criterion the argument seems correct, for it appears from the various surveys that have been made that the majority of merchants in cities using parking meters are in favor of meter controls.

No doubt some will question the significance of this evidence and point out that one would expect to find merchants in communities which use parking meters in favor of their operation. If this were not true, they point out, the meters would surely be removed. In turn, these people ask, "How many cities have given meters a trial and withdrawn them from use because of opposition from merchants or motorists?" The answer to this question, however, does not change the conclusion. The total number of cities which have removed meters (for all reasons) is only 6 to 8 per cent of the total number of cities which now use parking meters. In other words, once these control devices have been installed they have continued to be operated in over 90 per cent of the cases.

Arguments Against Parking Meters

The arguments which have been advanced against parking meters may also be grouped within four main classes or types: (1) parking meters are not a solution to the parking problem; (2) parking meters are a burden and an inconvenience to motorists; (3) parking meters decrease business in the metered areas (the effect of parking meters on sales within the metered area has already been discussed as an argument for meter controls); (4) parking meters present a legal problem.

Those who hold that parking meters are not a solution to the parking problem believe that meters are merely aspirin tablets, i.e., they mitigate the symptoms of the ailment but do not cure the fundamental cause. This argument presents a fundamental point of view that deserves consideration. A number of traffic authorities have pointed out the difficulties of trying to solve the parking problem at the curb or the center of the street. In the first place, the space provided by the curbs is often woefully inadequate to take care of the usual requirements of downtown parking. Second, curb parking seriously lessens the efficiency of downtown streets and adds to the already serious problem of traffic congestion and its resulting hazards. Those holding this view believe that the real solution of the parking problem must come from the development of off-street parking facilities, mass transportation, and better community planning. From a long-run point of view this argument appears to be sound. Its limitations, however, should also be recognized. The argument is not a criticism of parking meters as a device to control curb parking. It is an argument indicating that parking meters are not a cure-all for the parking problem, because meters must depend upon limited curb facilities for parking space.

The criticism that parking meters are a burden and an inconvenience to motorists takes several forms. It is asserted that parking meters place one more tax and one more harassment on car owners already suffering from too many of both these evils; that parking meters, in effect, make a motorist pay a tax for a device, the primary purpose of which is to make it easier to apprehend and fine him for parking violations; that, although the charge for parking is nominal, the aggregate charge against motorists eventually would be tremendous if the system were extended throughout business districts; and that parking meters are inconvenient to motorists who do not have proper change with them at the time of parking.

The argument that parking meters place one more tax and harassment on car owners, the primary purpose of which is to make it easier to apprehend and fine them for parking violations, is a debatable point. Whether or not the coin deposited in the meter is considered a tax — the courts have generally pointed out that it is not a tax — it does amount to another charge for the motorist. Advocates of parking meters, in meeting this particular argument, point out that the primary purpose of parking meters is to make it possible for the motorists with business to perform in the business district to find a convenient place to park; that it is, in fact, a service to the shopper, for it moves the all-day parker from the curb in the business district and gives the shopper an opportunity to park; and that the charge is necessary for the payment of costs of installation, supervision, inspection, operation, and maintenance of meters. Whether or not the service is worth the additional fee can not be answered categorically. A number of surveys in cities which use parking meters have shown that the majority of motorists favor parking meter controls. On the other hand, parking meters have been removed from some cities because of the opposition of motorists.

The argument that, although the fee is nominal, the aggregate charge is tremendous also has some validity depending upon the individual's conception of "tremendous." According to the *Municipal Year Book, 1946,* 323 cities of the 491 using parking meters in January, 1946, collected $1,008,293 during October, 1945.[6] If we assume 500 cities with parking meters today with the same average collections per city and per month, the 500 would collect about $18,700,000 a year. The trend since 1940 for the increased use of penny meters or combination penny-nickel meters (usually a meter in which a nickel may be deposited for one hour's parking time, a penny for twelve minutes, etc.) has offset somewhat this argument in regard to the amount of the fee or the total revenue collected. Combination meters have also lessened somewhat the possibility of inconvenience to motorists who do not have the proper change with them at the time of parking. This inconvenience, of course, can not be eliminated completely.

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[6] See footnote 2.

The legal difficulties involved in the use of parking meters have centered around three main questions: (1) whether or not motorists are entitled to free use of the streets, (2) whether or not meter installations are an illegal interference with the rights of owners of abutting property, and (3) whether a meter ordinance is a proper regulation or an invalid revenue measure.

In answer to these questions, the courts have usually ruled in favor of parking meters. They have pointed out that free use of the streets means use incident to travel and does not include the right to park vehicles; that the fundamental rights of owners of abutting property are subordinate to the interests of the public at large; and that the right to charge a fee is a power incident to and implied in the power to regulate and limit the time and place in which parking may be permitted. The last point probably has been the most difficult to answer. In answering it there has been first the question of the right to charge a fee at all, and second, the question of the amount which can properly be exacted. The solution has been developed by pointing out that a city has the right to regulate the time and the place of parking. Therefore, the city has the power to install a system of meters to regulate and control the time of parking. If it has the power to install a system of regulation, it has the power to impose a fee to cover the costs of installation, supervision, and maintenance of the system. The second part of the question is more difficult to solve. Fixing of the line between a regulatory fee and a revenue-producing tax is not easy, and the courts have not given a definite answer in the case of parking-meter ordinances. For example, in the only case decided by the Illinois Supreme Court (*City of Bloomington vs. Wirrick,* 381 Ill. 347) no question was raised in regard to the reasonableness of the charge made. The court merely pointed out this fact in upholding the decision of the lower court. In view of the fact, however, that the court held that the city has the power to impose a charge to be used for the maintenance, supervision, upkeep, and control of the parking meters, if the meters should produce far more than is required to maintain the system, it might be possible that the ordinance could be held invalid for that reason.

A final argument against parking meters is closely associated with the legal problem. It is alleged that many cities have misused the funds collected from the meters. Some people believe that this is one of the most serious criticisms that can be advanced against the system. They point out that if parking meters are installed they should be installed to meet a definite parking problem and not for purposes of revenue; that the amount collected should be in relation to the amount needed to install and maintain the meters; and, as a final step, that the funds collected should be spent for these purposes and for the improvement of traffic conditions. They argue that since the fees are paid by special groups, the revenue should be spent to improve traffic and parking for the benefit of those who paid the fees. Probably the principal reason for criticism on this point is the fact that the majority of cities credit parking meter revenue to a general fund. Of course, the placing of meter receipts in a general fund does not of itself mean that the revenue is diverted for uses other than parking and traffic. It does, however, set the stage for such practices. A specific fund for parking meter revenue would be a major step in the direction of meeting this argument.

These arguments for and against parking meters suggest that it is not possible to give a single answer "Yes" or "No" to the question, "Should parking meters be installed?" It is evident that parking meters are not a cure-all for the parking problem, but they may improve on-the-street or curb parking conditions and the flow of traffic in business districts. So long as curb parking is necessary, parking meters may be of material aid in enforcing space-hour regulations and in increasing the turnover of parked cars, thereby making it possible to accommodate more automobiles in a given area during a given time. The final answer, however, must depend upon analysis and study of local conditions and problems, and a forecast of costs, revenue, and results under a meter-controlled system.

Postwar Foreign Trade. — United States exports to all major areas since V-J Day have been running far above prewar levels in dollar volume, and the month-to-month trend for most areas has also been pronouncedly upward. The picture that the statistics of total exports give of these changes and of their effects on the United States balances of payments with the various areas, however, is seriously distorted by the inclusion of a large volume of "non-commercial" shipments — now primarily UNRRA and private relief, although during the war lend-lease shipments dominated this type of export. Such shipments are distinguished by the fact that they do not call for payment. In the second quarter of 1946 they accounted for 16 per cent of total United States exports. This percentage is itself considerable, but as a global average it conceals great disparities as between particular areas. Apart from the fact that they are a relatively passing phenomenon in our trade, such "non-commercial" shipments are also confusing to any trade or trade-balance analysis, because they fall almost as much outside the normal scope of international trade as the shipments made during and after the war to the United States Armed Forces abroad. — From the October *Monthly Review* of the Federal Reserve Bank of New York.

The Institute of Aeronautics

LESLIE A. BRYAN

Director, Institute of Aeronautics, University of Illinois

DURING the past summer the Institute of Aeronautics at the University of Illinois has become a going concern. Unique in its conception and a pioneering venture, the Institute is being looked to as a leader in the field of aviation among institutions of higher education. Under the leadership of president *Emeritus* Willard and with the active cooperation of Park Livingston, President of the Board of Trustees, together with the counsel and advice of an outstanding advisory board, the Institute was established as a horizontal administrating unit of all University aeronautical activity. The members of the advisory board are Dr. Baldwin M. Woods, University of California, Chairman; Dr. Bruce Uthus and Mr. Louis R. Inwood, Trans World Airlines; Commander Allen F. Bonnalie, President and General Manager, Lineas Aereas Mexicanas, S.A.; Colonel A. D. Tuttle, United Airlines; Mr. J. E. Schaefer, Boeing Aircraft; and Mr. W. J. Blachard, General Motors Corporation.

The horizontal type of organization makes the Institute of Aeronautics an administrative unit which in a cooperative way can cross departmental lines when it is advantageous to do so. As a result, formal and rigid department, college, or school requirements may be by-passed as desired in the interest of a realistic program. The departments, schools, and colleges are regarded as the vertical main shafts of the educational mine and the Institute as a horizontal connecting channel between the mine shafts. This form of organization helps to avoid the criticism of inbreeding that is sometimes levelled at university education. Figure 1 illustrates the line and staff composition of the Institute.

The Flight Program

As presently operated, the Institute of Aeronautics combines the functions of (1) flight instruction, (2) airport management, and (3) aeronautical research. Of these three activities the one with the widest appeal to students is flight instruction. This is conducted at the University Airport by a staff of twenty flight instructors, all of whom are service veterans. The majority of them are upper-class students on the campus, who work as part-time employees on an hourly basis. With one or two exceptions the flight instructors have been trained in the Institute's own program for flight instructors. This course provides the necessary transitional training from the service type of aircraft and maneuvers to civilian aircraft and procedures.

Flight instruction started in May, 1946, with twenty-four students, and will continue to expand until it levels off at an expected two hun-

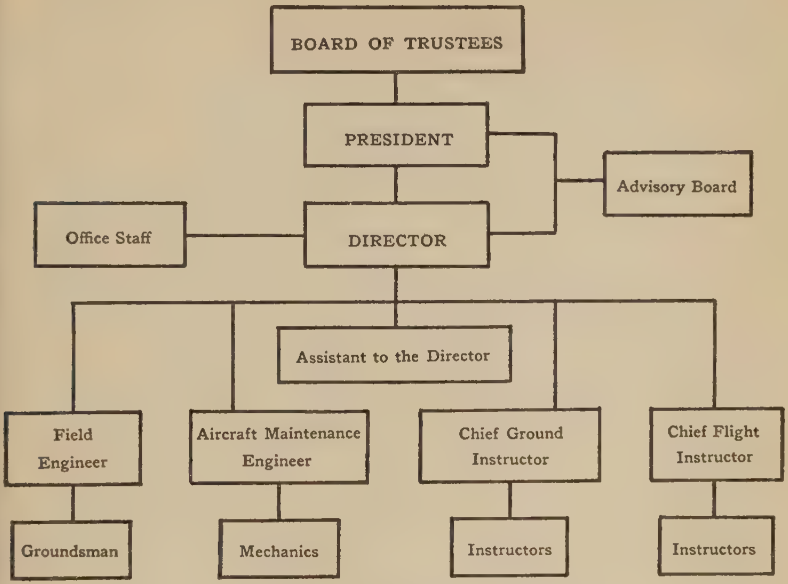

FIGURE 1

red and twenty-five students a se- ester. For this program a fleet of bout thirty airplanes will be used. t present the University owns and perates a fleet consisting of sixteen eronca Champions — a two-place ndem primary trainer; three Boe- g secondary trainers; three Cessna ide - by - side trainers; two Er- oupes — a two-control type plane; ne five-place Cessna; one Army- ype advanced trainer; one side-by- ide Taylorcraft; and one four-place tinson 150. This fleet will be aug- ented as the need indicates. In eneral, such a distribution of air- raft types will enable the Institute provide for all types of civilian ight training as well as some other eronautical activities.

The flight program consists of a private pilot course, a commercial pilot course, a flight instructor course, and an instrument course. Each course is conducted similarly to any other college course, with the class work on the campus and the laboratory session — the flight instruction — at the Airport. Each course gives three hours of credit. With a maximum of eighteen hours of ground and flight credit offered, it is almost possible to major in flying! Indeed, with the airlines getting back to prewar educational standards for pilots and other personnel, the possibility of an undergraduate major in aeronautics should be explored seriously. The courses have been set up with University standards in mind; they have also been approved by the Civil Aeronautics Administration as meeting its requirements for the Air Agency Certificate.

Flight instruction is under the general supervision of the Chief Flight Instructor, Mr. Jesse W. Stonecipher. Mr Stonecipher is a veteran flier with an excellent background of varied experience. He is a university graduate and learned to fly in the Civilian Pilot Training Program. Subsequently he has been an Army primary instructor, a Navy flight instructor, a Navy transport command pilot, and a civilian flight instructor. Figure 2 shows the setup of the University flight courses under his supervision.

Through the flight-training department will be handled also, as it is developed, a limited airplane charter service for University executives and faculty members who wish, in emergency or otherwise, to be transported by air. This activity will be confined to the University family and kept on a noncompetitive basis, supplementary to other types of transportation.

It is expected also that the Air ROTC flight activities will be carried on as a further function of the flight training department. If present plans materialize, both orientation and solo experience training will be offered to the Air ROTC trainees under a contract arrangement.

Coordinate with the flight program is the ground school or preflight work. A semester of college grade classroom activity runs concurrently with each of the flight courses. Flight training, thus, in a sense becomes a laboratory supplement to the preflight classes. Ground classes are conducted on the campus on a time schedule similar to that of other University classes. Featured in all the ground school courses are such subjects as aircraft servicing, meterology, the law of the air, and navigation as applied to the particular course which the student is taking. The ground school department is headed by Mr. Harry J. Sheffield, Jr., a University-trained teacher and a former pilot of the Army Air Corps.

Airport Management

In airport management the function of the Institute, for the past few months, has been largely that of continuing the work which started with the construction of the Airport. The Director of the Institute acts as manager of the Airport, with the Chief Pilot and Aircraft Maintenance Engineer doubling as assistant airport managers. At the present time they are concerned with building and maintaining a going organization. Airport activities involving relations with the three commercial operators using the field, major building operations, and other problems are handled by the Director in collaboration with the Purchasing, Physical Plant, and Comptroller's Departments, under the general administration of the President and the Board of Trustees.

General field maintenance is carried on largely through the activity of the Supervising Engineer, Mr. R. C. Maxwell, and his staff of about ten. Maintenance of runways, UNIVERSITY OF ILLINOIS · INSTITUTE OF AERONAUTICS · 318 ENGINEERING HALL

FLIGHT TRAINING COURSES

<table>
<tr><th>I.A.-1 — Private Pilot</th><th>I.A.-2 — Secondary</th><th>I.A.-3 — Intermediate</th><th>I.A.-4 — Advanced</th><th>I.A.-5 — Flight Instructor</th><th>I.A.-6 — Instrument Flight</th></tr>
<tr>
<td><i>Flight</i> — 35-45 hours
<i>Aircraft</i> —
Two-place Tandem Monoplane, 65 h.p.
<table><tr><th colspan="2">TOTAL</th><th colspan="2">X-COUNTRY</th></tr><tr><td>Dual</td><td>Solo</td><td>Dual</td><td>Solo</td></tr><tr><td>18-23</td><td>17-22</td><td>2</td><td>5</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 50 hours
1. Civil Air Regulations
2. General Service of Aircraft
3. Meteorology
4. Navigation
5. Radio
<i>Credit</i> — 3 semester hours
I.A.-1 Meets Requirements for C.A.A. Private Pilot Rating and C.A.A. Basic Ground School.</td>
<td><i>Flight</i> — 44 hours
<i>Aircraft</i> —
Two-place Side-by-side Monoplane, 85 h.p.
<table><tr><th>DUAL</th><th>SOLO</th></tr><tr><td>6</td><td>16</td></tr></table><i>Aircraft</i> —
2-place Tandem Biplane, 220 h.p.
<table><tr><th>DUAL</th><th>SOLO</th></tr><tr><td>10</td><td>12</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 36 hours
1. Civil Air Regulations
2. Meteorology
3. Radio
<i>Credit</i> — 3 semester hours</td>
<td><i>Flight</i> — 44 hours
<i>Aircraft</i> —
Two-place Side-by-side, 85 h.p., and Two-place Tandem, 65 h.p.
<table><tr><th colspan="2">NIGHT</th></tr><tr><td>Dual</td><td>Solo</td></tr><tr><td>2</td><td>8</td></tr></table><table><tr><th colspan="2">CROSS-COUNTRY</th></tr><tr><td>Dual</td><td>Solo</td></tr><tr><td>9</td><td>22</td></tr></table><i>Aircraft</i> —
Four-place, 150 h.p
<table><tr><th>DUAL — NIGHT CROSS-COUNTRY</th></tr><tr><td>3</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 36 hours
1. Navigation
<i>Credit</i> — 3 semester hours</td>
<td><i>Flight</i> — 44-49 hours
<i>Aircraft</i> —
Two-place Tandem, 65 h.p., and Two-place Tandem, 550 h.p.
<table><tr><th>DUAL</th><th>SOLO</th></tr><tr><td>14-19</td><td>30</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 50 hours
1. Aircraft
2. Aircraft Engines
<i>Credit</i> — 3 semester hours</td>
<td rowspan="2"><i>Flight</i> — 40-45 hours
<i>Aircraft</i> —
Two-place Tandem, 65 h.p.
<table><tr><th>DUAL</th><th>SOLO</th><th>INSTRUCTOR PRACTICE</th></tr><tr><td>8-13</td><td>10</td><td>22</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 40 hours
1. Psychology of Flight Instruction
2. Techniques
<i>Credit</i> — 3 semester hours
I.A.-5 Qualifies for C.A.A. Flight Instructor Rating.</td>
<td rowspan="2"><i>Flight</i> — 20-30 hours
<i>Aircraft</i> —
Monoplane, 150 h.p.
<table><tr><th>DUAL</th><th>LINK</th></tr><tr><td>20-30</td><td>10-20</td></tr></table><i>Fee</i> — $250
<i>Ground Training</i> — 40 hours
1. Civil Air Regulations
2. Meteorology
3. Aircraft and Theory of Flight
4. Navigation
5. Instruments
6. Instrument Flight Procedures
<i>Credit</i> — 3 semester hours
I.A.-6 Qualifies for C.A.A. Instrument Flight Rating.</td>
</tr>
<tr><td colspan="4">I.A.-1, 2, 3, and 4 Meet Requirements for C. A. Commercial Pilot Rating and C.A.A. Advanced Ground School.</td></tr>
<tr><td colspan="6">The fee for the individual course includes individual insurance coverage, books, and transportation to and from the Airport.</td></tr>
</table>

FIGURE 2

turf markings, boundary markers, field lighting, roadways, power and heat, and general policing come in this domain. There is always something new in the field maintenance department. If it isn't mowing some 700 acres of turf, it is snow removal and runway sanding.

Estimates indicate that in the next ten years at least 3,000 new airports will be opened in the United States. Obviously, such airports will require trained personnel for their management. Universities should not fail to recognize their obligations to train students for airport management. The University of Illinois is working out a cooperative arrangement between the College of Commerce and Business Administration and the Institute which will give students some practical work in airport management and operation, as well as a theoretical background. Similarly universities should assume some leadership in striving to solve many of the economic, legal, management, and other unanswered problems in the field of airport operation and management.

An unusual opportunity to be of help in these fields is offered the Institute as a horizontal integrating agency in an institution such as the University of Illinois. The physical airport itself will in some respects act as a laboratory for the testing and proving of managerial methods. With its paved runways 5,300 feet in length, its unobstructed approaches, its usable turf areas, and its service facilities, the airfield can accommodate any type of aircraft now flying or projected in the immediate future. With the subsequent installation of night landing equipment and radio traffic control facilities, it will rival the best commercial ports of the United States.

The work of aircraft maintenance and repair requires a shop with stockroom, machinery, and personnel capable of handling large or small repair jobs. Such a shop is now in operation at the Airport under the supervision of the Aircraft Maintenance Engineer, Mr. Arthur E. Beachler. Mr. Beachler is a graduate engineer and an Army veteran. He has had wide experience with both service and civilian types of airplanes and engines. His staff of about ten consists of aircraft and engine mechanics, instrument and propeller technicians, stockroom clerks, and helpers. They are responsible for the mechanical well-being of the University flight equipment and for emergency repairs on transient aircraft.

The maintenance department keeps a comprehensive daily checking and periodic overhaul system. Each University-owned aircraft in active service is checked over at the end of each day's flying by a government-licensed mechanic who certifies in writing that the plane is airworthy, if such is the case. The plane is then placed on the flight line, at which point it is line-checked and signed for by the pilot who is going to fly it. At the conclusion of the flight the pilot certifies in writing either that the craft functioned satisfactorily or that he noticed details which should be changed. In the latter event, it is the duty of the maintenance department to check the reported maladjustment before returning the aircraft to flight service. At the conclusion of every 100 hours of flying time a periodic check is run by a licensed mechanic. This is more comprehensive than the daily check and requires about a day's time to complete. The handling of aircraft into and out of the hangars, as well as the refueling and servicing of transient aircraft, is a part of the maintenance crew's work.

On a small scale, the maintenance department is now conducting an in-service or on-the-job training program to prepare students for the CAA Aircraft and Engine Mechanic rating. The Board of Trustees has approved the eventual expansion of this in-service work into a two-year terminal course, on a subprofessional level. The curriculum for the course would be approximately 75 per cent technical and 25 per cent liberal in content. It is felt that through such a course the University can render a needed educational service to the student who for some reason does not wish a four-year, degree course. There is also contemplated a cooperative tie-in with the aeronautical engineering curriculum, under which the practical shopwork required of Aeronautical Engineering students might be combined advantageously with that of the group whose primary interest is vocational.

Aeronautical Research Activities

As its third function, the Institute of Aeronautics is set up as the administrative agency which is responsible for the fostering and correlation of the educational and research activities related to aviation in all parts of the University. Obviously this is a big order and one which over a period of years will offer opportunity for a unique contribution to aviation. At the present time the Institute is cooperating with the Departments of Aeronautical Engineering, Psychology, and Ceramics, in particular. Other projects will be undertaken in the future. It is the present policy not to conduct research independently but to channel it into those departments of the University which have the staff and the facilities to handle it.

The Institute projects two types of publications — first, a group of reports on research results; and, second, a series of pamphlets involving subjects of a service nature to the citizens of the State. Some publications of the latter type are in process at the present time. Among these are one on Municipal Airports and one on the use of the airplane by the farmer. These publications are under the editorial and research direction of Miss Bernice Schrader, a pilot, educator, author, and editor of wide experience.

In conclusion, a word should be said concerning the educational philosophy which influences the work of the Institute. From the preceding description of the line and staff organization and with regard to the field of research and other activities, the guiding policies of cooperation, service, and integration are apparent. Not so apparent, perhaps, is the conviction of the Institute that the whole field of aeronautics offers a phase of education that has most urgent implications for the future. We believe, that since the curve of aviation interest rises to a peak during the formative years, high school and college students are the most air-minded group in the population. Hence the opportunities to enrich and add to the standard curriculum, as well as to make education relevant to the age in which we live, are great indeed. The University Airport is dedicated to educational, commercial, military and community service. So, too, is the Institute dedicated to the accomplishment of its legitimate part in all fields of aviation education. We believe that, since the use of the air is primarily in the realms of transportation and communication, the outstanding concomitant of air development lies in the field of human relations. The Institute hopes to be of service in this field also.

War Periods. — During a war period there is a sudden change in the economic life not only of the warring countries but also, because of intricate relationships, of the entire economic system of the world. Forces are set in motion which have a far-reaching and permanent influence. The economic balance which had been maintained before the war is disrupted by the giant upheaval. . . .

The full effects of the destruction of wealth and the serious dislocations caused by war do not show themselves immediately after the conflict but are delayed because of the huge vacuum of deferred demand. Commodity prices continue to advance, but the pressure of accumulated stocks, strained credit conditions, and temporary exhaustion of consumer buying power bring about a recession. This was the pattern after the Napoleonic, the Civil, the Franco-Prussian, and the two World Wars. — From *New England Letter* (First National Bank of Boston), October 31, 1946.

Gain in Employment. — As a result of the continued heavy pressure of demand for goods, the volume of nonfarm employment has moved steadily upward, after allowance for seasonal influences, at a pace which has outdistanced the additions to the civilian labor force resulting from the return of veterans and, to a smaller extent, the backflow of former war workers. The volume of unemployment was cut to about 2 million in August and September and the number of veterans awaiting reentry into the labor force has been reduced. In the 13 months since V-J Day, there has been a net gain of more than 4 million persons in civilian nonagricultural employment. — From *Survey of Current Business,* October, 1946.

Selection of Airport Sites

WILLIAM E. THOMAS

Assistant Professor of Accountancy, University of Illinois

THE Federal Airport Act, passed in May, 1946, authorizes the expenditure of $500,00,000 of Federal funds for the onstruction and improvement of ublicly owned airports in the deelopment of a nation-wide system f airports as outlined in "The ational Airport Plan." (See article n August issue of *Opinion and omment*). The Federal funds are o be supplemented by those of the ublic agencies which will own the ndividual airports. At the writing f this article, the procedure to be ollowed by public agencies in seuring inclusion in the Federal proram is in the process of formulaon. The plan is to decentralize the work of the Civil Aeronautics Administration and to use field offices or dealing with the public agencies which desire to sponsor airports. n Illinois, the CAA District Engieer, with offices in Springfield, and he State Department of Aeronauics are expected to work closely ogether in the development of the State system of airports which will be an integral part of the national system. These agencies are now enaged in revising long-range plans nd in considering specific projects or development in the next three years.

Although procedures have not been outlined, it seems that the first tep for a public agency which desires to be an airport sponsor in the Federal program is to find out from the State Department of Aeronautics and the District Engineer of CAA whether those agencies have considered such an airport in their plans. If so, the public agency will probably be asked to make some of the surveys discussed herein before the project can be considered further. If the proposed port has not been included in their plans, some of the surveys may be useful in "selling" the project to the agencies, or they may indicate to sponsors that the project should be shelved for the time being.

Preliminary Planning Required

The necessity of preliminary local planning was stressed by Mr. T. P. Wright, the Civil Aeronautics Administrator, who told the annual meeting of the Chamber of Commerce of the United States, "The more local planning that is done the lighter will be the CAA task and the faster actual construction can begin. At best, very little construction work can get under way before next spring. If you make sure that your community has all necessary legislative authority to participate in the program, if you get your site selection and design details well under way, and if you make all possible preparations for the necessary financing, then you can be assured that your project will move forward rapidly."

When the members of a community feel that its airport needs are not or will not be satisfied by privately owned and operated airports, and that some type of governmental action is necessary, they must decide which governmental unit should acquire and operate the airport. In Illinois there are various possibilities. In counties of less than 500,000 population, the county board may establish and maintain airports if it follows the procedure outlined in the Illinois law. Such a county may also join with any one or more taxing districts lying wholly or partly within the county in the construction and maintenance of an airport, provided that the voters approve the agreement. Counties in general have the power to acquire, construct, and operate airports and to appropriate money, levy and collect taxes, and borrow money for such a purpose. Cities and villages likewise, have the power to acquire and operate airports.

In addition to the power extended to the customary governmental units of counties, cities, and villages, the Illinois law provides for the formation of an airport authority. The authority is an incorporated area of contiguous territory having a population of not less than 5,000 and not more than 500,000, containing one or more municipalities, and not including an area contained within the limits of an existing airport authority or an aviation district. The authority is to be governed by a board of commissioners, which has in general the power to establish and operate an airport within its corporate limits, to protect the approaches, to regulate flight over the territory of the authority, to exercise police power to protect its property and the public health and safety, and, subject to provisions of the State law, to borrow money to accomplish the corporate purposes. As provided in the Act, the authority is also empowered to levy and collect a general tax on taxable property for the purpose of paying for operation and maintenance of the airport and for other corporate expenses of the authority.

It is outside the scope of this article to discuss the various provisions of the law regarding the establishment of airports in Illinois. The reader who is interested is referred to a booklet of "Laws Relating to Aeronautics" issued by the Department of Aeronautics, Springfield, Illinois.

Establishing the Size and Type of Airport

At the same time that consideration is being given to the problem of selecting the proper governmental unit for sponsorship of the airport, the size, type, and function of the airport or group of airports should be considered. The selection of the sponsor can not be well made without considering the cost of constructing and maintaining the airport, its effect upon taxes and bonded indebtedness, and whether the sponsorship by one governmental unit or another will most effectively meet the needs of the people in that area. To answer that question, a survey must be made to discover the probable aeronautical activity and hence the size and type of facilities needed.

The preliminary information need not be detailed, but when the sponsor has been selected and begins the planning, the survey must be as definite and as accurate as possible, since it will provide the basis for determining the amount of funds to be used for construction, as well as of public funds that may be required in the future for maintenance and operation.

The survey should indicate the immediate and the future volume of activity in terms of plane landings and take-offs at peak periods, planes to be based at the airport, and the number of passengers, flight crews, and other persons who will use the airport facilities.

Determining the Needs of an Area

Three general approaches to the problem may be used. One is to utilize statistics of the nation's total air activity and predictions concerning its volume in the next ten years, and base the estimate on the relationship between the region being surveyed and the total national economy. The second method is comparative; that is, the region can be compared with other regions which have aviation experience. The third approach is through an analytical survey of the region.

When the decision is to be based upon the relationship between the area and the nation, the economic data and the analytical procedures underlying the national estimate are determined. The same data and procedures are applied to the region being studied and percentages of the national totals are used to measure probable local activity. For example, if population and national income are factors in arriving at the national estimate, the population and the income of the region are to be determined and expressed as percentages of the national figures. The derived percentage of the national estimate of aviation activity is the estimate for the region.

One weakness of this method is that the final estimate is no better than the national estimate upon which it is based. A second difficulty is that the relationships among the economic factors such as per capita income, population, volume of production, volume of wholesale sales, and proportion of employment which might be used in reaching the national estimate will probably not be the same for the region. Hence, their relative importance in the generation of air activity must be carefully studied. A third deficiency in the approach is that it can not provide for wide variations among communities in factors which have an important effect upon air travel, such as the type of surrounding terrain, perhaps with attendant difficulties in surface travel, existing surface-carrier service, distance from other cities to which travel goes, and community of interests among the region and others.

The second approach is to study the characteristics of a community which seem to indicate a propensity for air travel, and compare them with those of cities which have had experience in the operation of airports. A complete compilation would include such qualitative factors as the number of persons gainfully employed, proportion of professional and executive people in the population, number of income tax reports filed, per capita retail sales, and the number of telephones per one hundred families. The quantitative factors would include population, retail sales volume, wholesale sales volume, number of factories, number of wholesalers, number of mines, volume of production, wage payments, and bank clearings. Data should also be gathered in regard to such facts as the distance from and the community of interest with other cities, the terrain and its effect upon surface travel, the surface-carrier service available, and the direction and volume of surface travel.

The next step is to determine what communities with air experience are suitable for comparison. It is difficult to resolve differences in terrain and surface travel difficulties into differences in air-travel volume, and it is little less difficult to resolve the differences in qualitative factors. Therefore, in seeking other communities for comparative purposes, it is desirable to choose them: first, from the standpoint of similarity in terrain and surface travel, and the relationships between the communities and other cities, both physical and economic; second, for similarity in the qualitative factors; and third, from the standpoint of the quantitative factors. If this sequence of choices is followed, the greatest probability for adjustments will fall in the class of items which can be adjusted most easily and with the highest degree of validity in the result.

The third approach is to make an analytical survey of the region. Scheduled air transportation, private business flying, and private personal flying are covered in the investigation. The estimate of the activity of commercial aircraft is built up by studying the existing airlines and deciding how the community might fit into the air pattern — that is, whether the community might be added as a stop, and the probable frequency of flights. The various airlines involved should provide information on this point. Carriers which have applications pending before the CAB for certificates of convenience and necessity may have included the community in their applications, subject to the availability of a landing area. Such applications should be studied and the volume of proposed service noted. Care should be taken, however, to eliminate possible duplications; in many cases, several applications are made to the CAB for certificates covering practically the same routes and, of course, only one will be granted.

Attention should then be directed to the possibility that some good routes have been overlooked by existing and prospective carriers. Probable airport activity for these routes must be based upon a study of potential air traffic which could be generated on the whole route, as well as upon the potential traffic to be generated on such a route by the community in question. The acvity on the route as a whole will t the number of flights and tend determine the number of landings nd take-offs at each airport. The stimate of potential traffic on the oute is based upon an exhaustive udy of all stops on the route with espect to the qualitative and quanti- tive economic factors relating to r travel propensity (as previously utlined in this section), as well as pon other indications of the volume nd direction of travel, such as in- ercity hotel registrations, highway raffic counts, analysis of reserva- ions for sporting events and other orms of entertainment, and study f rail and bus travel if such data re available. The technique of ana- yzing these data and reaching a onclusion is too involved for dis- ussion here.

As a result of these investiga- ions, it should be possible to make reasonable estimate of the num- er of air travelers to be handled t the terminal building, the number f plane movements and their prob- ble peak, and the type of planes o be accommodated — for example, vhether feeder-line or trunk-line ype transports.

The volume of private flying must lso be estimated in terms of planes o be based at the airport and the umber of plane movements. There re two types of private flying: first, usiness travel in planes owned by usiness firms; and second, travel n matters of personal business and leasure in privately owned planes. Air travel of the first type is par- icularly useful in maintaining close upervision over operations which re decentralized, as is often the case of large companies in the extractive industries. Some manufacturing companies have several plants. In the field of distribution there are regional and district sales offices. Supervisors in all such industries must travel to secure the proper control and coordination of operations.

Because indexes of general business activity do not indicate the size and type of organization of various business firms in each community, it is difficult to use a comparative approach in making an estimate. The alternative is a survey of the business firms, by interview or questionnaire, to determine whether planes will be used for business travel, whether the planes used will be based at the airport or planes based elsewhere will visit the field, and the approximate number of movements.

The estimate of the amount of private flying may be based upon the cost of owning and operating a plane, the utility of the plane to the owner, and the income of individuals in the community. For some time, private planes will continue to be expensive to own and operate; for many people they will be only a secondary means of transportation. Most persons will continue to need an automobile for local transportation and to reach the airport; hence the ownership of a plane would add to the total amount which the individual must spend for transportation. In general, private flying is probably a marginal form of transportation, especially if common air carrier services are available, and thus will not be used until all other more important needs, such as food, shelter, clothing, and transportation by automobile, have been satisfied. In the lower-income groups there would probably be few who could or would own and operate a plane. At some higher level, for example, an income of $4,000, some of the group may find the utility of plane ownership great enough to justify the expenditure. At the higher income levels, greater proportions of the individuals will be able to own planes. Any survey, then, may be confined to the medium-to high-income groups, and should determine whether persons are now planning to purchase aircraft either in the immediate future or later after they have bought homes, automobiles, or other desired articles. This knowledge would be of assistance in planning the size of the airport for immediate development and in predicting future needs.

To check the results of the survey, various estimates of the number of private planes to be owned in the nation ten years hence may be used to arrive at an estimate for the community. For example, Mr. V. Perlo of the War Production Board, quoted in *Civil Aviation and the National Economy,* estimates that the proportions of consumer units in each of these income groups which can afford and plan to purchase planes within the next ten years are as follows: over $15,000, 40 per cent; from $10,000 to $15,000, 24 per cent; from $5,000 to $10,000, 10 per cent. These percentages should not be applied blindly but possibly modified, in view of deviations of local conditions from the assumptions made by Mr. Perlo in this study. Also, the size of the family and other factors may cause individual families to spend varying amounts above or below the average. Accordingly, further adjustments may need to be made if the community has families in any income group, particularly $5,000 to $10,000, which are larger than the national average. Furthermore, this method of estimating requirements for private flying does not include planes which may be owned on a pooled or club basis, because that form of ownership will appeal to those in the lower income group; hence some estimate must be made of this type of ownership.

Site Selection Problems: Physical Requirements

When the estimate of need, based upon such a survey, begins to take form, the work of determining the proper location for the airport can begin. There are certain physical prerequisites which must be met before any site can be considered as a possible location, and there are other physical characteristics which are not absolute but can be compromised if economic considerations make that desirable. If more than one site meets the basic physical requirements, the selection of one site will be made on economic bases.

Among the physical factors to be considered are size, grading, drainage, meteorology, distance from airports and airways, and availability of public utilities.

The size of the airport required will depend upon the results of the survey of community needs. The survey indicated the number of planes to be based at the airport, the size of commercial planes and the frequency of their movements, and the number of private flyers and airline passengers. The performance of the aircraft which will use the field is the most important element in determining the length of the landing strips and runways. It is measured by the index obtained by multiplying the wing loading by the power loading. The wing loading is the gross load in pounds divided by the number of square feet in the total wing area. As wing loading increases, the stalling speed increases; hence greater speed is required both prior to take-off and for gliding in for a landing. Power loading is the gross weight of the plane divided by available horse power. Generally, as the power loading increases, the rate of climb decreases and thus the distance for take-off is increased. The indexes of various aircraft have been related to the class of airports needed to accommodate them, and these tables are published by CAA in the booklet *Airport Design*. In general, the classification is:

Class 1. Airports with landing strips of 1,800 to 2,700 feet will accommodate small, owner-type planes including those with gross weight up to 4,000 pounds or with an index of more than 190.

Class 2. Airports with landing strips of 2,700 to 3,700 feet will accommodate some privately owned planes and some small transport planes, including those with gross weight up to 15,000 pounds, and an index number up to 230.

Class 3. Airports with landing strips of 3,700 to 4,700 feet can be used by present-day transports of gross weight between 10,000 and 50,000 pounds and an index number of 230 or more.

Classes 4 and 5. Airports with landing strips of 4,700 to 5,700 feet, and 5,700 feet or more, respectively, will accommodate the largest planes planned for the near future, with gross weight of 74,000 pounds or more and index numbers of more than 230.

The lengths of the landing strips as stated are based upon sea level. The length of the landing strip must be increased for any conditions which decrease the density of air. These include greater elevation above sea level, barometric pressure independent of effective elevation above sea level, and high temperature prevailing at any time during the year.

Another factor which influences the size of the airport is the necessity of aligning the landing strips with prevailing winds. Landings and take-offs should be into the wind, and design standards call for a sufficient number of runways to permit landings and take-offs within 22½° of the wind direction. Therefore, the greater the variability of the direction of the wind, the greater the number of landing strips needed to secure the coverage required, which for the smaller ports is 70 per cent and for the larger ports 90 per cent of the time. The alignment of the landing strips is determined on the basis of a wind rose, that is, a graphical representation of the direction and intensity of the winds. The data may be obtained from the Weather Bureau and should cover a ten-year period.

The presence of obstructions is another highly important element in the selection of a site. Aircraft require a clear path for their approach to the landing area. Hazards include mountains, ridges, hills, trees, smokestacks, power lines, etc. The glide path ratio, that is, the number of feet traveled forward to each foot of descent, depends upon the aircraft. The glide path for aircraft which can be accommodated at a Class 1 field is 20 to 1; for larger fields it is 30 to 1; and where instrument landings are to be made, it is 40 to 1. The approach zone which should be clear for an airport is 500 feet at the end of the runway to 2,500 feet at a distance of two miles; whereas for instrument landing the glide path should be cleared in a zone of 1,000 feet at the end of the runway to 4,000 feet at a distance of two miles. Thought should also be given to the possibility of expanding the airport by building dual runways, thus creating new approach zones which must be clear. The approaches may be protected by zoning and by purchase of air rights.

Size is affected not only by the length of the runways and their alignment but also by the number of plane movements which are expected at peak periods. For the sake of safety there must be a time interval between landings or take-offs. If one minute is allowed between flights, the capacity of the runway would be limited to 60 movements an hour, under contact conditions. In bad weather the number of movements might be only 15 or 20. To accommodate peak movements it may be necessary to construct parallel runways, 700 feet between center lines, which would almost double the capacity of the port but would also substantially increase the acreage needed for the site.

The topography of the site is very important in ascertaining the amount of grading required. Because of the large area covered by the airport and the small grades permitted for the runways, the differences in the cost of grading two different sites might be substantial. The engineers will also make a soil survey to determine difficulties in grading and the drainage requirements. The nature of the soil layers, the slope of the site, the water table, and natural water courses for disposal — all these are factors governing the type and extent of the drainage system. The soil should be of a type which will support turf needed for the landing area and to prevent erosion.

In selecting one of several sites the meterological conditions are to be considered. The wind rose has already been mentioned in connection with alignment of the runways. The constancy of the wind may be different at the different sites; this factor should be studied. Two atmospheric conditions which may vary a great deal among sites are fog and smoke. Either fog or industrial noke carried by the wind over the rport severely restricts the utility the field. The duration as well as e frequency of restricted visibility important. Such conditions cause elay or cancellation of flights leavg the airport, and incoming flights e delayed or ordered to land at an ternate airport. This is detrimental r the airline companies, both beuse of revenue lost on the canled flights and because travelers ho had planned to take the flight hich was canceled may feel that r transportation is unreliable and erefore use surface transportation the future. For the traveler the nceled flight may be merely an inonvenience, but it might result in rious losses to a businessman beuse of his inability to keep a siness engagement.

If there are other airports in the gion, the site chosen for the new rport should not be so near them to create possible conflict in the affic which uses any two airports. he amount of area needed for the affic pattern depends upon the airaft using the airport and the contions under which they operate. here is no absolute standard but enerally a radius of two miles is onsidered sufficient for a Class 1 rport; a major airport generally eeds a radius of four miles; and rports serving instrument operaons probably need a radius of ven miles.

Site Selection: Economic Considerations

ot only must the selection of the te satisfy certain physical prerequites, but certain economic factors must also be considered. Airports are expensive to construct and to operate; what may seem to be small differences in the physical aspects of two sites may, when translated into dollars, indicate substantial differences in costs of construction and of maintenance. For example, differences in the soil characteristics and the water tables of two sites may forecast substantial differences in the cost of the drainage system. Other factors to consider are the possibility of developing a recreational area in conjunction with the airport and the location of the airport in relation to its potential users.

The cost of the site and the construction costs are the most obvious considerations in selecting a site. Not only should the cost of the site itself be considered but also other items which might suggest that the site with the highest land cost might actually be the most economical to develop. Hazards to aviation may have to be purchased and demolished, or relocated, and it may be necessary to purchase easements through airspace. Seemingly small differences in topography may, because of the grades required for runways, result in important differences in grading costs. Soil characteristics vary the cost of the drainage system and the cost of establishing and maintaining adequate turf on the landing area; and the bearing quality will affect the cost of paving the runways, taxiways, and aprons. The construction of a railroad spur may reduce the cost of transporting construction materials to the site; after the airport begins operation, a spur might prove useful in coordinating air and rail movements of cargo. A supply of sand or gravel on or near the site may also reduce the construction costs. The airport requires power for operation of lights and machines and a water supply for consumption and fire protection. Power lines may have to be extended a considerable distance to reach some sites, and if water from the municipality is not available it will be necessary to drill wells and install pumping equipment and storage tanks. The proximity of roads suitable for high-speed travel would also tend to reduce developmental costs of the project.

The presence of material resources suitable for recreational development should be given serious consideration for all airports — particularly, for airports on which commercial activity will light. Recreational facilities such as golf courses, tennis courts, and rivers and lakes for swimming and boating will not only attract the general public and provide income from non-aeronautical sources but also, by providing an introduction to flying, stimulate an interest in aeronautics and thus in the long run increase the aeronautical income of the airport.

Accessibility is of the utmost importance in the final selection of one of two or more sites which meet the physical requirements from an aeronautical standpoint. Accessibility should be thought of, not in terms of types of roads, or miles from the city, but in terms of the length of time which it takes the users to reach the airport. Air travel has changed the measurement of travel from miles traveled to time traveled. Since air transportation is able to give the traveler a great time advantage over surface travel, the advantage should not be lost in supplementary means of travel to and from the airport. The time differential between air and surface travel should be protected; it is particularly important for the airport which will serve primarily the short-haul traveler on main lines, and even more so on feeder lines where the routing may be more or less circuitous. If airports are located at such a distance from the origin and destination of passengers in town that surface travel can seriously compete, the chances for the success of the airport will be lessened by the possible loss of travelers and consequently, perhaps, of the landing fees paid by the carriers.

The CAA states in *Civil Aviation and the National Economy* that on air trips the average ground time required for travel between airport and city is one hour and twenty minutes (forty minutes each way). A check of travel time listed on airline time tables shows times ranging from 15 minutes to 50 minutes, and the greater time is not always in the metropolitan areas. Once such a handicap has been established by the location of the airport, there is little the engineer can do to increase the speed of travel on the shorter trips. The aeronautical engineer may double the cruising speed of the plane, but his gain will be largely canceled. For example, assume travel between two points 300 miles apart (airport to airport), a plane with block-to-block speed of 150 les per hour, and ground travel ne of 30 minutes at each terminal. ne trip time would be 3 hours. If e speed of the plane were in- eased 100 per cent to 300 m.p.h., e time would be reduced only 33 r cent. On a short trip of 150 les, the trip time would be 2 hours, d after an increase in speed of 100 r cent the trip would take 1½ urs, a reduction of only 25 per nt. The closer the airport to the igin and the destination of the aveler, the greater will be the re- tionship between increase in plane eed and saving in trip time for avelers.

Another way in which distance of e airport from the city affects mmercial air operations is in the ndling of air cargo. Where the stance is great, it is uneconomical use light trucks and dispatch them om the airport terminal for pick- and delivery. Consolidation of ads is desirable for the long trip, d this leads to the establishment a downtown terminal to serve as base for pick-up and delivery and airport terminal to sort for out- ing flights, handle interline trans- rs, and consolidate loads for the wntown terminal. As a result, cilities are duplicated and hand- g costs increased.

For the private flyer the airport ust not be too far distant from s home or place of business. If he es his plane for business travel he interested in speed and does not ish to be handicapped by excessive ound travel time. If the flying is r recreation, the ground travel me reduces the time available for creational flying. The CAA in 1940 made a survey which disclosed that 18.7 per cent of the private flyers who gave up their planes did so because the aircraft were not utilized sufficiently, one very important reason being the excessive time spent going to and from the airport.

For the small city, the relative accessibility of several sites is largely a function of their distance from the physical center of the city, modified by the type and condition of the roads leading to them. The choice of the site with regard to this factor, although very important, is not difficult to make. However, for a metropolitan area or for a regional airport which is to serve several communities, the problem is not only important but difficult to solve. In such places there may be significant differences in time to reach the site from various parts of the urban area or the regions which use the airport. Thus in considering the location of such an airport from the standpoint of accessibility, it is necessary to study the community in an attempt to approximate the origin of out-going travelers and cargo and the destination of incoming traffic, as well as the location of potential plane owners. The airline travelers may be either residents of the community or visitors to the city. A determination of the center of gravity of the population and its trend would be of value in locating the airport conveniently for residents. The center of gravity of hotel accommodations will indicate the points of origin and destination of a large proportion of visitors to the community.

Indications are that during the next few years the fare on air feeder lines will be higher than that of competing surface transportation. It may be expected that the higher-income groups will use the premium service to a greater extent than others; hence the center of population may be modified to give effect to the location of the higher-income groups. The survey of possible owners of business planes suggested in connection with establishing the requirements of the airport would also be used to obtain the location in the community of the prospective owners. As mentioned earlier, most of the owners of private planes will be in the group with incomes of $4,000 or more, with the percentage of ownership larger for each progressively higher group. To locate the center of gravity of these potential plane owners, it is necessary to determine the location of family units and their level of income. The relative incomes of the family units may be translated into relative rentals for the purpose of making the study. Thus the study will show for the various sections of the community the number of family units and their general income levels. By using available national estimates as to the proportions of plane ownership by various income groups, the potential plane ownership in the various sections can be computed and the center of gravity located.

The best location for facilitating cargo movement is even more difficult to determine. If a survey reveals a concentration of industrial and commercial establishments, the airport may be located with relation to the center of gravity, but if the establishments are dispersed, it may be desirable to study the probability that the products of each will be shipped by air. For example, in a suburb a concentration of dealers in construction materials, coal, and ice can be ignored, but one or two factories in the same location which produce pharmaceuticals should be seriously considered as sources of air cargo. Products which are manufactured or which are received for use in manufacture or distribution in the various sections of the community should be checked for characteristics which indicate they may be air cargo at the present level of freight rates or will probably be transported by air if the rates are lowered.

Land use is still another economic complication in site selection. Consideration must be given to uses of surrounding land and to the questions of whether an airport would raise or lower the value of the land, whether the site itself might not be better used for residential or industrial expansion, and whether use of such a large area might not interfere too seriously with the street pattern and arterial highways.

In selecting the site for an airport, the factors which have been discussed must all be considered. Some of the factors, such as those relating to construction and maintenance, can be translated into dollars and totaled for each site to provide an over-all comparison of possible sites. Other factors, such as and use, may not be readily exressed in dollars, and their evaluaion in the comparison is a matter f judgment.

The future of air transportation n the national economy is largely ependent upon the development of n integrated system of airports. he Federal government is proiding financial assistance and killed engineers for consultation, but the responsibility for initiating an airport project and constructing and operating the airport rests with the political subdivisions. This initiative must not be expressed in impetuous action motivated by the jealousy of political subdivisions but should take form as deliberate action, based upon an appraisal of all the economic factors, present and future.

Rise in Population. — According to a recent Census estimate, in July the opulation of the United States passed the 141,000,000 mark. Another Census eport revealed the startling fact that in three years of migration, resulting mainly from movement of military personnel and industrial shifting, a comined mass of 27,000,000 persons moved from one section of this country to nother. This vast human upheaval dwarfed the uprooting and shifting of 0,000,000 persons by the Nazis.

APR - 7 1947

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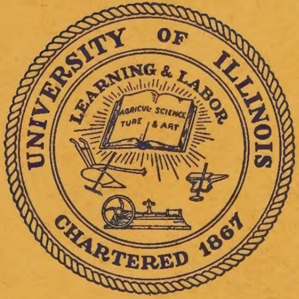
PR - 7 1947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